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JOURNAL

OF THE

Boston Society of Medical Sciences.

No. 16.

JUNE, 1897.

[Number 16 is the last that will be for free distribution. The amount of material offered is so great that the funds of the society will not permit of the continuance of the present plan. In the fall, however, the "Journal" will begin the second volume in an enlarged form, adhering to the fundamental ideas of *authors' abstracts* and *prompt publication*, but a subscription price will be asked for. Of this due notice will be given. An index of the numbers already issued will be sent out shortly. — EDITOR.]

At the meeting held June 15, 1897, Dr. E. M. HARTWELL spoke upon

"PUBLIC BATHS IN EUROPE."

He exhibited a series of lantern slides illustrating — as regards plan and structure — some of the most typical European forms of public baths: viz., (1) floating swimming baths; (2) combination swimming and cleanliness baths; (3) cleansing baths for soldiers, school children, and workmen. The illustrations included views and plans of British, French, German, Austrian, and Hungarian bath establishments.

The movement for providing the poorer classes in crowded towns with bath-houses at public expense, and available throughout the year, had its beginning in Liverpool. In 1842 the corporation of Liverpool, which had maintained a floating bath-house on the Mersey since 1794, erected the "Frederick-street Bath and Wash-house," which was the first of its kind, and served as a model for most of the British and continental public bath establishments built prior to 1870. The wash-house feature of the Frederick-street Bath owed its adoption to the success of a private wash-house established by a benevolent Liverpool woman during a cholera epidemic. London and other English cities speedily followed the example of Liverpool. In 1854 there were twenty-three towns in Great Britain possessed of public bath-houses, representing a capital outlay of over £180,000.

In 1894 there were in England 191 municipal boards, mostly acting as local sanitary authorities, engaged in the management of bath and wash houses, and open bathing places. The number of separate establishments now considerably exceeds 200 — as many local boards have charge of several establishments. Liverpool and Manchester, for instance, have each 9 public baths. Open-air swimming pools in public parks are found in Manchester, Birmingham, and London. But the typi-

cal form of British public bath is a monumental structure, containing swimming pools, private tub-baths, and public laundries. Vapor baths are found in many establishments. As a rule British bath-houses are elaborate and costly. The costliest of them is the Buckingham Palace Road Bath, belonging to the Parish of St. George, Hanover Square, in London. It cost upwards of £48,000. The policy of building comparatively unpretentious and inexpensive baths is gaining favor; and experience now shows that very serviceable establishments can be erected in England at a cost of from £7,000 to £10,000.

In 1894 the outstanding loans for municipal bath and wash houses amounted to £1,270,000 in round numbers. In that year the receipts of local authorities in England charged with the management of municipal baths amounted to £428,000, their expenditures being £404,000.

Hamburg, in 1855, was the first German city to build a bath and wash house of the British type. As a rule the larger German cities now possess municipal baths of the monumental type. Most of them have been built since 1870, but are without wash-houses. In Germany it is rather more common than in Great Britain to keep the swimming pools open throughout the year. In the period 1886–1896 nearly nine millions of marks were

expended upon public or semi-public bath-houses of the combination type. The best German examples of this type are more highly developed than the newest and most costly of the British municipal baths, being more generally supplied than the latter with rain baths, douches, and vapor baths.

"People's bath-houses" of various sorts have increased rapidly in number in Germany since 1883. They are frequently found in cities also having costly monumental establishments. People's baths rarely have swimming pools. Warm tub and shower baths constitute the leading features in such establishments. In not a few of them shower baths only are provided. People's bath-houses, costing from 20,000 to 50,000 marks, are steadily increasing in number and popularity in Germany.

Vienna has 10 municipal *Volksbäder* which contain shower-bath accommodations (without tubs or pools) for both sexes, and it is intended to furnish each of the 19 districts of the city with at least one such *Volksbad*. The charge for a bath in these establishments amounts to about 2½ cents. In 1893 in 9 *Volksbäder* 525,815 shower baths were taken at a net cost to the city of 18,000 gulden.

Rain baths (*Brausebäder*) of the "Lassar-Grove" type, so called, are particularly worthy of study by American sanitarians and philanthropists. On account of their simplicity, cheapness, and effective-

ness, their use has rapidly increased in Germany during the last dozen years. They are now comparatively common, not only in military barracks, schoolhouses, and people's baths, but also in industrial establishments, such as foundries, mills, chemical works, gas works, and government shops. In no part of the world are workmen's baths so common as in Germany.

The experience of the leading commercial and industrial cities in Europe during the past fifty years shows that the provision of public baths is a wise policy. As a rule such establishments have proved popular, and largely self-supporting so far as running expenses are concerned. Though the policy of erecting imposing and costly structures has many advocates, there is a steadily growing opinion among experts that relatively small and inexpensive cleanliness baths, so placed as to be easily accessible to the dwellers in congested districts, constitute the most useful form of public bath establishment.

Dr. R. W. Lovett made

"A CRITICISM OF THE ACCEPTED POSITION OF THE FEET IN MILITARY AND GYMNASTIC DRILL."

Two positions of the foot may be recognized.

(1.) What may be called the normal, where the inner condyle of the femur, the inner malleolus, and the inner border of the great toe are in the same

vertical plane. This position is maintained by muscular contraction, and is the position of strength and vigor.

(2.) The pronated position, which is a displacement of the foot outward in relation to the leg. This is the position of ligamentous as distinguished from muscular support — the position of weakness and fatigue. It is a pathological condition in itself, and it is often the initial stage of flatfoot.

The normal position passes into the pathological chiefly by a motion at the medio tarsal joint. The toes remain still, and the leg rotates inward.

The weight-bearing surface of the foot can be observed only through glass by means of a mirror set under the glass reflecting the image of the pressure surface of the foot. Normally the outer border should bear weight in this position. In pronation the outer border lifts, and only two islands are in contact with the glass.

If the feet are placed parallel to each other and straight forward, the weight is thrown more upon the outer border of the foot than if they are everted to an angle of 90° to each other; in other words, the angle of eversion of 90° tends to throw the weight more to the inner side of the foot in standing, and in this way must favor pronation.

Inasmuch as pronation is the attitude of weakness and not of muscular strength, it is an open

question whether it is wise to cultivate the position of eversion of the feet in educational exercises. The subject is one meriting careful investigation.

Dr. W. T. Councilman demonstrated

"PATHOLOGICAL CASES,"

showing microscopic specimens from the lung in a case of diphtheria, which contained large numbers of diphtheria bacilli in the tissue. Pulmonary lesions in the form of small foci of broncho-pneumonia are constantly present in the lungs in cases of diphtheria. Most often the diphtheria bacilli are not found on microscopic examination, or they are present only in the bronchi along with other organisms, chiefly streptococci. In this case there are not only the foci of broncho-pneumonia, but in places an actual necrosis and breaking down of the tissue resulting in abscess formation. The diphtheria bacilli are in such numbers that when observed under a low power they appear as blue masses. They are present in groups, and enclosed in the pus cells. It appears from this that the bacilli may be not only the causative agent of the broncho-pneumonia of diphtheria, but may actually lead to abscess formation.

The specimen was hardened in Zenker's fluid, and stained with alkaline methylene-blue and eosine.

Dr. T. Leary presented a report of two cases of

"DIPHTHERITIC GASTRITIS."

E. C., 5 years of age, was admitted to the South Department, Boston City Hospital, April 17. Little history could be obtained except that child had been sick with a sore throat for three days. Child much prostrated. Temperature, 101.3; pulse, 120; necrotic membrane on both tonsils. Slight broncho-pneumonia of left back. Marked septic odor. Cultures from throat showed K.L. Child became progressively worse, and died April 19, — 48 hours after admission. There had been no vomiting, food being taken in the ordinary way with little difficulty.

Autopsy April 20, 1897.

There were multiple subcutaneous ecchymoses over trunk and limbs.

Posterior nares covered with thin gray membrane, easily removed. Both tonsils completely necrotic, showing a deep central loss of substance. Tonsils are ragged, brownish black, with shreds of tissue hanging loose, and have an extremely foul odor. Necrosis extends to the tissues about tonsils, thence down over the root of tongue and over the anterior surface and tip of epiglottis, where it is superficial.

Pharynx injected; mucous membrane intact.

SPECIAL NOTICE.

The Journal of the Boston Society of Medical Sciences is issued, for the present, for free distribution. It will contain *authors'* abstracts of papers presented at the meetings of the Society, and will be published *promptly* after each meeting. A vote of the Faculty of the Harvard Medical School requests "each Head of Department to have, at least, a summary of the scientific investigations made in his Department presented at a meeting of the Boston Society of Medical Sciences for preservation in its Journal," so that the Journal will contain a summary of what work of this nature is done in this School. Similar action has been taken by the Biological and Physiological Departments of the Massachusetts Institute of Technology, and contributions of the same nature are promised from Clark University and from the Experimental Laboratories of the Massachusetts General and the Boston City Hospitals.

Papers, or abstracts of papers, upon subjects connected with the Medical Sciences will be welcomed from persons who are not members, and if approved by the Council, will be presented at these meetings, and abstracts will be given a place in the Journal of the Society. When desired, their insertion will be accompanied by a note indicating the place where they may be found in full.

All communications should be addressed to the

Secretary of the Boston Society of Medical Sciences,

HARVARD MEDICAL SCHOOL,

BOSTON, MASS.

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Cervical lymph glands show focal necroses.

Broncho-pneumonia in base of left lung.

Spleen. — Multiple miliary necroses, confined to malpighian bodies. General lymphatic hyperplasia.

Stomach. — Beginning sharply at cardiac orifice and ending almost as sharply at pyloric orifice, the mucous membrane is covered by a thick, ragged, greenish-brown, gangrenous pseudo-membrane, which emits an exceedingly foul odor; is thicker apparently over the rugæ, and is rather easily removed, leaving a red granular surface beneath. The stomach contained considerable black semi-fluid material. The whole of stomach wall is thickened; peritoneal surface smooth, and of a dull green color. Cultures showed K.L. in tonsils, streptococci in lung. K.L. and streptococci in liver, spleen, and ears, a variety of organisms in stomach, K.L. and streptococci being abundant.

Section of stomach shows enormous fibrinous exudation on the surface, with necrosis of the epithelium, involving in places only the upper layer, in places extending down to and through the muscularis mucosæ. In places there are extensive hæmorrhages in the tissue. The lymph follicles are not enlarged. The fibrinous exudation is thick, heavy, and in places beautifully reticulated. The submucous tissue is œdematous, distended, more

or less infiltrated with cells. The muscle coats are normal; stained for bacteria, with a low power, there are numerous masses in the diphtheritic membrane, in the surface, and in places in the submucous tissue.

These bacteria are principally large streptococci. Scattered over the surface of the false membrane are masses of bacteria, principally bacilli in great variety. The masses of bacteria in the mucous membrane and submucous tissue are exclusively streptococci.

Numbers of groups of perfectly definite diphtheria bacilli are found in the diphtheritic membrane, generally comparatively low down.

J. E., 5 years of age, was sent to the South Department, May 29, from the Massachusetts Eye & Ear Infirmary, with diphtheritic conjunctivitis of both eyes. There was desquamation over whole surface of body and scalp. There was also present an erythematous rash suggesting measles. Necrotic membrane over tonsils and pharynx. Cultures from nose, throat, and both eyes positive. Died June 8, 1897. There had been no vomiting.

Autopsy June 8.

There was present diphtheritic conjunctivitis, rhinitis, tonsillitis, pharyngitis, and otitis. Pulmonary, glandular, and intestinal tuberculosis.

Stomach. — Beginning at cardiac orifice there is an area along the lesser curvature, in which the mucous membrane is eroded to a considerable depth in irregular patches running toward the pylorus. The surface is red and granular, with an occasional patch of yellowish adherent membrane. From this area extended lines of ulceration for a considerable distance just alongside the summit of the rugæ. Just above pylorus, along lesser curvature, is another irregular patch of erosion which is in connection with first area by the slender line of ulceration.

CULTURES.

Heart. — Sterile.

Pharynx and lung. — Abundant K.L. and staph. aureus.

Liver, spleen, kidney, and cervical glands. — Pure streptococcus ; gastro-hepatic glands and both middle ears, streptococcus and K.L.

Microscopical preparations have not as yet been made.

There have been reported very few cases of diphtheritic gastritis, Kahn being the only author who regards the process as not uncommon. The two cases above reported are the only ones which have been found in 136 autopsies on diphtheria at the Boston City Hospital. It is interesting to note that in both cases there was a general streptococcus infection in addition to the diphtheria, and that in

one there was tuberculosis, which agrees with the findings of observers abroad. There have been no cases reported in America in which there was bacteriological proof of the character of the process. Unfortunately, in the first case cultures were not taken from the gastro-hepatic lymph glands, although the presence of K.L. in cultures from the diphtheritic membrane, and their demonstration microscopically in the membrane would seem to offer satisfactory proof. There was no vomiting in either of these cases, the process was not suspected, and so tests of the stomach contents for free HCl. (which was found completely absent in one case reported by W. Soltair Fenwick before the London Pathological Society) were not made. It is also interesting that in neither of these cases was the œsophagus affected, infection having probably taken place by swallowing particles of membrane which passed over, but did not affect, the œsophageal mucous membrane.

Drs. Theobald Smith and J. R. Stewart gave an account of

"SPONTANEOUS PSEUDO-TUBERCULOSIS IN A GUINEA-PIG, AND THE BACILLUS CAUSING IT."

No excuse need be offered for the study of infectious diseases of the smaller mammals. The history

of bacteriology is a sufficient witness of their importance in furnishing information upon etiology.

The guinea-pig which is the source of this brief note was bought in Boston in November, 1895, for use in work upon diphtheria antitoxin. After two weeks the hind limbs became partially paralyzed. A small dose of toxin finally proved fatal.

On examination the liver contained about 12 abscesses from 2 to 8 mm. in diameter. The spleen was considerably enlarged and similarly permeated with abscesses. There was an abscess of the sixth right and of the ninth left rib at the vertebral articulation, and considerable enlargement of the greater part of both ribs. There was beginning disease of the sternal end of 5 ribs of the left and 2 of the right side. The name pseudo-tuberculosis was suggested by these focal lesions, although it is by no means a satisfactory designation.

Histological examination showed that these changes in spleen and liver were due to a purulent infiltration of the tissue, followed by disintegration centrally, and the formation of a connective tissue capsule on the periphery of each focus.

Cultures showed the presence in these foci of a bacillus which was to all appearances the cause, but which in pure culture has not thus far produced precisely the same changes observed in the spontaneous case.

The morphological characters are in brief as follows: Bacilli, about as large as the true colon bacillus, motile. Flagella grouped about body of bacillus like those of the colon and the typhoid bacillus. Bacilli stain promptly with basic aniline dyes. In some cultures the stainable portion of the bacillus is collected at the poles, leaving a central clear zone. This appearance is not uncommon with *B. coli*.

Among the biological characters, the following are of the most importance:

1. Ready growth upon the ordinary culture media in use. No pigment production.

2. No liquefaction of gelatine. Colonies resembling those of *B. coli* when the conditions of growth are very favorable, otherwise smaller.

3. No change in milk until after 3 or 4 weeks, when it becomes translucent, owing to a slow increase in the intensity of the alkaline reaction.

4. Growth on potato, feeble, whitish, sometimes absent.

5. No indol production.

6. Gas and acid formation in 1 per cent. dextrose bouillon.

Gas formula in the fermentation tube approximately $\frac{H}{CO_2} = \frac{2}{1}$. Total acidity 4.5 per cent. of a normal acid solution.

Neither gas nor acid appears in lactose and saccharose bouillon.

The pathogenic characters of this bacillus have been studied upon rabbits, mice, and guinea-pigs.

In rabbits, subcutaneous injection produced only an abscess at the point of inoculation. Injected into an ear vein 0.3$^{cc.}$ of a bouillon culture proved fatal in 48 hours. The more pronounced lesions were: Subcutaneous veins distended with fluid blood. Liver large, pale, and showing very minute necrotic foci; spleen dark, large; lungs sprinkled with hæmorrhagic points; heart muscle fatty.

Subcutaneous injection of culture fluid, as well as feeding cultures on bread, proved fatal to the ordinary gray mouse in 4 to 6 days. The lesions seemed most pronounced in the intestines, which were distended with a yellowish fluid. Focal lesions not recognized.

In guinea-pigs the effect of subcutaneous injection varied considerably with the age of the animal and the quantity and age of the culture. Death ensued in from 1 to 2 weeks after inoculation. At the point of injection an abscess developed, whose size grew with the duration of the disease. The liver and kidneys showed the usual parenchymatous changes. In spleen and liver not infrequently disseminated, usually quite minute necroses.

Injection of small doses into the peritoneal cavity

is more promptly fatal and results in a fibrinous and cellular exudate covering spleen and liver and portions of abdominal wall. Effusions into both abdomen and thorax may be present.

Feeding the bacilli by pouring cultures on the food is fatal in from 4 to 8 days. In one instance there was marked infiltration of Peyers' patches and of the mesenteric glands.

Latterly there is evidence of a gradual attenuation, as the effect upon guinea-pigs is less certain. The fact that the disease found in the original case was not exactly reproducible experimentally need not militate against the etiology as here laid down. The conditions shaping infection and disease after infection are complex, and the resulting lesions may vary with the mode of infection, the number and virulence of the bacilli introduced, and the age and condition of the guinea-pig.

This bacillus is closely related to the bacilli which have been isolated from poisonous meat products and from the organs of those who succumbed to the poisoning. Among these outbreaks may be mentioned those studied by Gaffky, Gärtner, Van Ermengem, Kaensche, and Günther.

It is also closely related to the bacilli which call forth epizootics of swine pest or hog cholera in this country and in Europe, and to *B. typhi murium* of Löffler. All of these, the meat poison and the

swine pest bacilli, belong to one great group (or species) in virtue of the identity of their morphological and biological characters. Some members of the group exhibit more of the invasive or parasitic, others more of the toxic characters. The bacillus under consideration may be identical with *B. typhi murium*, and hence we have refrained from naming it and adding thereby to the confusion of nomenclature already beyond control.

Dr. F. B. Mallory showed a specimen of

"ENORMOUSLY DILATED SIGMOID FLEXURE"

due to volvulus. The case was one of 20 years' standing. Distension occurred at irregular intervals and was relieved by rectal tube. No adhesions had taken place. At the time of the autopsy the sigmoid flexure measured 114 centimeters in length, and 22 centimeters in diameter at the point of greatest distention.

Dr. J. H. Wright showed a

"HEART"

which presented congenital defects in the intraventricular septum, and in the mitral and tricuspid valves.

The defect in the septum had been compensated for by a cusp of the tricuspid valve, which was

adherent around the margin of the opening, effectually closing it.

The specimen was regarded as affording an example of the adaptability of an organ to pathological conditions.

The heart was that of a female child about eight years of age, dead of persistent intestinal hæmorrhages, which were associated with the presence of a Meckel's diverticulum.

Dr. G. N. Stewart, of Cleveland, Ohio, presented a preliminary note on

"THE RELATIONS OF THE ELECTROLYTES TO THE NON-ELECTROLYTES IN THE BLOOD-CORPUSCLES AND BLOOD-SERUM."

1. The electrical resistance of defibrinated blood is from 3 to 5 times greater than that of the serum.

2. When defibrinated blood is centrifugalized, and samples taken from different portions of the tube, the electrical resistance increases with the proportion of corpuscles in the sample; *e.g.*, the resistance of a sample taken from the bottom of the tube may be 15 times that of the serum, or even more.

3. Since in such sediments there is always some serum between the corpuscles, the conclusion seems warranted that, in comparison with the serum, the blood corpuscles are non-conductors.

4. Two explanations of this fact suggest themselves:

(*a*) That the corpuscles, while containing dissociated ions, and therefore (on the theory of Arrhenius, etc.) capable of electrolytic conduction in their interior, are surrounded by a non-conducting envelope — an envelope, let us say, which refuses passage to the ions that exist in blood, but not necessarily an envelope structurally differentiated from the rest of the corpuscle.

(*b*) That throughout the whole substance of the corpuscle the bodies (inorganic salts) which would otherwise behave as electrolytes are combined with the non-conducting (non-dissociable) molecules (proteids and hæmoglobin), and thus rendered for the time non-dissociable.

5. An attempt has been made to decide between the explanations by breaking up the corpuscles in various ways, and determining the effect on the electrical resistance, and among others the following facts have been made out:

(*a*) On the addition to defibrinated blood of a quantity of distilled water sufficient to cause "laking," the resistance is either absolutely diminished, in spite of the dilution, or it is increased in a smaller proportion than is the case when serum is similarly diluted.

(*b*) When a sediment rich in corpuscles is "laked" by the addition of distilled water, the diminution of resistance is much greater than when defibrinated blood is equally diluted.

(*c*) When blood is rendered "laky" by repeated freezing and thawing, the resistance is not in general lessened, but may be somewhat increased; but if distilled water be now added to the already laked blood, the resistance is diminished just as if the water had been originally added to unlaked blood.

It is evident that while 5 (*a*) and 5 (*b*) are compatible with both of the explanations suggested under 4, 5 (*c*) is greatly in favor of the second explanation; for it seems to show that not only may the inorganic salts of the corpuscles be bound down in non-dissociable combinations within the intact corpuscles, but that those combinations, or some of them, *can* exist even after the corpuscles have been broken up, so long as they are not exposed to the dissociating influence of dilution. The stability of the quantitative and even qualitative differences in the easily diffusible inorganic constituents, not only between blood corpuscles and plasma, but between the organized material and the liquid of the tissues in general, seems to require some such theory for its explanation. And if similar facts could be demonstrated in the case of such tissues as muscle and nerve, they would have an important bearing on the

explanation of various phenomena (the difference of apparent resistance in the longitudinal and in the transverse direction, electrotonic currents, and other so-called polarization phenomena, the high degree of polarizability of these tissues as compared with the polarizability of the surface of contact of ordinary solutions of electrolytes, etc). The investigation is being pursued, and a detailed communication will be made later on.

The telephone method was used in determining the resistances.

JUNE 3, 1897.

My Dear Sir:

The Journal of the Boston Society of Medical Sciences will be enlarged to octavo size in October. By general consent of the Heads of Departments it will contain full abstracts of experimental work carried on in the following institutions: the Medical School of Harvard University; the Experimental Laboratories of the Massachusetts General and the Boston City Hospitals; the Physiological and Biological departments of the Massachusetts Institute of Technology; and Clark University.

The numbers of the Journal will be issued promptly after each meeting of the Society, furnishing a very rapid means of communication of the results of investigation.

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Yours very truly,

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